Evaluation of ERTS-1 Image Sensor

Spatial Resolution in Photographic Form

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Type I

Progress Report 4

Prepared for

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Introduction

This report describes progress on this contract during the period 3/1/73 - 5/1/73. The first set of digital microdensitometer data from scans of ERTS and aircraft (A/C) frames are being analyzed at the present time.

Discussion

Images, in 70 mm format, from the ERTS bands 4, 5, and 6, ID#1129-18181, have been scanned in selected areas. The same gound area has been scanned in A/C imagery, bands 001, 002, and 003. The regions scanned are shown in Figure 1. Points A and B are used as references to align scan 1, from which the other two scans can be aligned.

The instrument being used is the Data Micro-Analyzer with the following parameters:

influx optics (condenser)		B & L 40 mm f.l.
		0.08 NA
efflux optics (objective)		B & L 48 mm f.l.
		0.08 NA
slit size	ERTS scans:	0.0114 X 0.138 mm
	A/C scans:	0.0350 X 0.874 mm
sample interval		
	ERTS scans:	0.010 mm
	A/C scans:	0.010 mm

These digital microdensitometer data will be analyzed and will yield an

Optical Transfer Function (OTF) for the ERTS imagery from data set 2 (see Type II report dated 3/73). In regard to data set 3, three ERTS MSS images from the 1/4/73 pass over San Francisco have been received and we are in the process of selecting the regions to be scanned in this imagery. Over 50 images from the A/C Vintens were taken on 1/4/73 and all are within ± 20 minutes of the ERTS images. However, band 001 (green) of the Vintens malfunctioned and produced no imagery.

The current status of acquired imagery is given below. A check indicates the data has been received.

Set	Flight Date	Aircraft (A/C) Vinten	Aircraft (A/C) Scanner	Aircraft (A/C) #frames	ERTS-1 MSS
1	8/22/72	✓	NA	184	
	8/23/72				✓
	(Arizona)				
2	11/29/72	✓	✓*	18	✓
	(San Francisco)				
3	1/4/73	✓**	on order	51	✓
	(San Francisco)				
4	4/4/73	on order	on order		ID not available yet
	(San Francisco)				
5	Scheduled for 5/73 - 7/73				

*Scanner data not suitable for analysis because of severe geometric distortion arising from the lack of a gyrostabilized platform on the A/C.

**Band 001 (green) malfunction, no imagery.

Acknowledgements

Mead Technology Laboratories (Dayton, Ohio), who have recently become an Industrial Associate of the Optical Sciences Center, are performing the microdensitometer scanning for this contract.

Frames Studied

#1129 - 18181

Data Requests Submitted

None

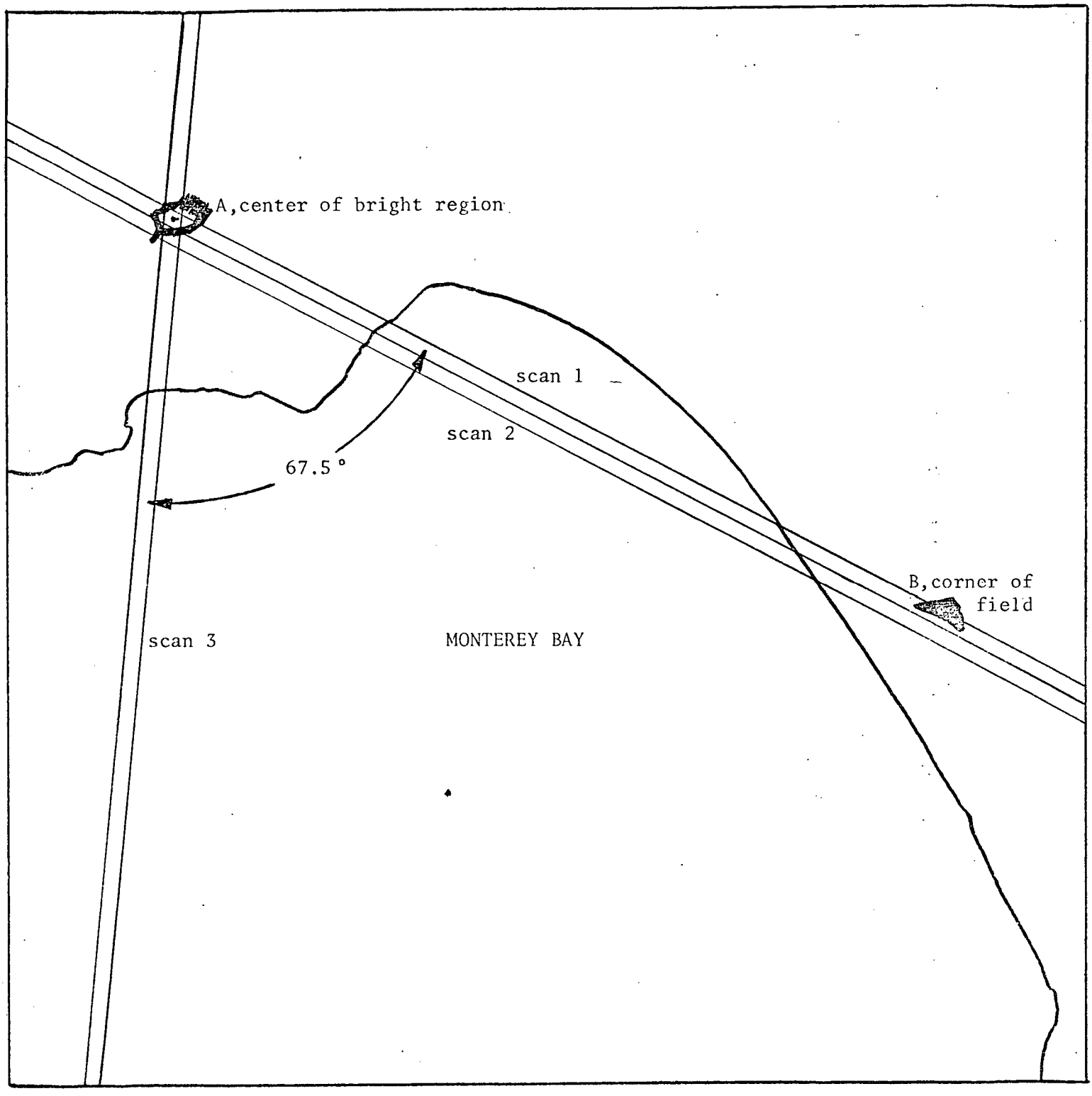

Figure 1
Aircraft image selected from data set 2 for comparison with ERTS image #1129-18181.

REPORT SUMMARY

Evaluation of ERTS-1 Image Sensor Spatial Resolution in Photographic Form

Type I Report #4

Catagory 9a - Sensor Technology

This report describes progress on contract number NAS5-21849, during the period 3/1/73 - 5/1/73. Microdensitometer scans of data set 2 are discussed briefly and the acquisition status of required data is made current.